

Transportation Element

Introduction

Transportation systems are important to the quality of life within a community as they play a significant role in providing access to employment, recreation, and public institutions and gathering places. Amesbury has a long and storied history, dominated by a long duration as an industrial mill center. Since the decline and subsequent flight of its chief industries, some of its vacated mill buildings have been reoccupied with different uses. During all of this time, Amesbury has maintained its quaint character of a typical New England Village. Outside of the downtown village area is a quiet bedroom community that is well served by roadways and served to a lesser degree by transit service leading to workplaces in the Lawrence and Boston metropolitan cores and also to regional employment centers, such as the Lord Timothy Dexter Green Industrial Park in Newburyport. The Town still has some amounts of undeveloped land in outlying areas, which have the potential to be developed for residential and commercial uses. Land development will likely have an impact on Amesbury's transportation infrastructure. However, the magnitude of impact will depend on the type, density, and location of future development.

This transportation section includes an inventory of existing transportation facilities and services, the safety of the transportation network, and an analysis of existing traffic demands placed upon the most congested locations.

Regional Context

Amesbury is located within the lower Merrimack River Valley, approximately 33 miles north of Boston and approximately 5 miles northwest of Newburyport. Amesbury is part of the Merrimack Valley planning region and is part of the Boston Urbanized Area as defined in the 2000 Census, with ties to the former Lawrence/Haverhill urbanized area.

The Merrimack Valley Metropolitan Planning Organization (MPO) conducts regional transportation planning for 15 communities within the Merrimack Valley Planning Commission area, including Amesbury. The MPO is the federally designated transportation planning organization, which is comprised of the following members:

- Merrimack Valley Planning Commission (MVPC)

- Merrimack Valley Regional Transit Authority (MVRTA)
- Massachusetts Highway Department (MHD)
- Executive Office of Transportation and Construction
- Mayor of Lawrence
- Mayor of Haverhill
- Chief officials of two urban communities in the Valley
- Chief officials of two non urban communities in the Valley

The MPO is responsible for prioritizing transportation improvement projects within the region for funding, conducting planning studies, and developing a long-range transportation plan to coordinate regional transportation actions. Perhaps the two most important planning documents are the Regional Transportation Plan and the Transportation Improvement Program.

Merrimack Valley Region 2003 Transportation Plan

The Merrimack Valley Region 2003 Transportation Plan describes and evaluates the existing regional transportation system, including all the major modes of transportation such as highways, mass transit, freight, rail, bicycle and pedestrian travel. It also identifies transportation improvements that are needed to address any existing transportation needs as well as those projected to take place over the next 25 years.

Under Long-Range Transportation Projects, the Merrimack Valley Region 2003 Transportation Plan lists the proposed and approved highway projects over the next 25 years. Table T-1 lists those projects both approved by MassHighway (MHD) and those suggested by officials of the municipality.

Table T-1
Listing of Proposed and Approved Highway Projects

Facility	Project Type	Estimated Cost	Source
Powow Riverwalk and Bikeway	Trail/Bikepath Const.		MHD Approved
Oak Street bridge over B&M Railroad	Bridge Rehabilitation	\$713,000	MHD Approved
I-95 bridge over the Merrimack River	Bridge Rehabilitation	\$110,000,000	MHD Approved
I-495 southbound bridge over Route 150	Bridge Rehabilitation	\$795,000	Bridge Rating
Elm St. from High St. to Monroe St.	Roadway Reconstruction	\$2,500,000	MHD Approved
Pond Street bridge	Bridge Rehabilitation	\$1,000,000	Municipality
R Street bridge over the Powow River	Bridge Rehabilitation	\$1,000,000	MHD Approved
Route 110, from Rt. 150 to Merrill St.	Roadway Reconstruction	\$2,000,000	MHD Approved
Route 150, from Rt. 110 to Main St.	Roadway Reconstruction	\$1,000,000	MHD Approved
Thomson Street bridge	Bridge Rehabilitation	\$1,000,000	MHD Approved

Also identified in the 2003 Regional Transportation Plan are recommendations and observations made regarding the status of on-road bike routes in the Town. These are explained in further detail in the Transportation Facilities section of this chapter.



Transportation Improvement Program

The region's Draft FFY 2004-2008 Transportation Improvement Program (TIP) prioritizes the region's projects within certain financial constraints over the next four years, based on need and readiness to progress forward. The Draft 2004-2008 TIP includes six projects that are programmed in Amesbury. Table T-2 lists those projects both approved by MassHighway and those suggested by officials of the municipality.

Table T-2
Transportation Improvement Program Listings for Projects in Amesbury

Fiscal Year	Project Description	Federal Funding	State Funding	Total Project Cost	Fund. Category*
2004	Reconstruct I-95 bridge over Merrimack		\$110,000,000	\$110,000,000	NFA
2004	Replace Main St. bridge over Merrimack		\$3,860,000	\$3,860,000	NFA
2004	Replace R Street bridge over Back River		\$571,000	\$571,000	NFA
2005	Replace Oak Street bridge over B&M RR		\$713,000	\$713,000	NFA
2005	Reconstruct Route 150	\$800,000	\$200,000	\$1,000,000	STP
2007	Reconstruct Rt. 110 from I-495 to Merrill St.	\$1,600,000	\$400,000	\$2,000,000	STP

* Funding Category: STP = Surface Transportation Program; NFA = Non-Federal Aid.

Three bridges are listed as programmed for Federal Fiscal Year 2004 because MassHighway is committed to using state and federal funds to fix all bridges in the Commonwealth that are in such a poor condition that they are considered structurally deficient. MassHighway engineers use the American Association of State Highway Transportation Officials (AASHTO) rating formula to determine quantitatively the adequacy of the bridge structures. The rating is a method of evaluating bridges by calculating three factors to obtain a numeric value, which indicates bridge sufficiency. The resulting figure is a number from 0 to 100. It may also be looked at as a percentage, in which 100 percent would represent an entirely sufficient bridge and 0 percent would represent an entirely insufficient or deficient bridge. The three factors that are used in the formula are:

- Structural sufficiency (adequate for its intended load and safe enough to carry it?).
- Serviceability and functional obsolescence. Considerations including carrying capacity in relation to average daily traffic.
- How essential the bridge is for public use? Considerations include the number of vehicles it carries, the length of the detour that would result if it is closed, and the bridge's importance in maintaining fire, police and medical services to an area.

According to recent inspections, the Interstate 95 (I-95) bridge over the Merrimack River has a 21.0 AASHTO rating; the Main Street bridge has a 16.5 AASHTO rating; and the R street bridge has a 47.5 AASHTO rating. The Oak Street bridge is listed as being functionally obsolete.



Journey-to-Work Information

As part of each decennial census, detailed information on journey to work flows is collected using the so-called “long form”. Tables T-3 and T-3A below provide a comparison of the 1990 and 2000 Censuses in terms of where Amesbury residents who don’t work at home travel to work and where persons who work in Amesbury live.

Table T-3 shows that in 2000 fewer Amesbury residents work in town than was the case in 1990, although this decline is relatively slight. It is also interesting to note that fewer Amesbury residents work in Salisbury, North Andover, Peabody and Seabrook, NH than in 1990 as well. This is somewhat counterbalanced by the fact that there was a significant increase in the number of Amesbury residents working in nearby Newburyport. Other cities/towns showing significant gains include Andover, the major employment community in the Merrimack Valley, and Lawrence.

Overall, the data shows that Amesbury residents are traveling farther to their jobs in 2000 than was the case in 1990.

Table T-3
1990 and 2000 Place of Work Data for Amesbury Residents
Working Outside Their Home

Work Destination	1990	2000	Change
Amesbury	2,077	1,985	-92
Newburyport	902	1,156	254
Salisbury	367	199	-168
Haverhill	283	300	17
Danvers	282	375	93
North Andover	261	161	-100
Boston	255	324	69
Seabrook, NH	171	146	-25
Peabody	165	140	-25
Lawrence	144	253	109
Andover	141	314	173
Lynn	116	152	36
Beverly	93	166	73
Others	<u>1,835</u>	<u>2,750</u>	<u>915</u>
TOTAL	7,092	8,421	1,329

Table T-3A is significant in that it shows that eight of the twelve communities that sent the most workers to Amesbury in 1990 sent fewer workers to the town in 2000. Many of these communities are located nearby such as in Haverhill, Salisbury, Merrimac and West Newbury. Again, the exception to this trend is in Newburyport, which was the home of 44 more Amesbury workers in 2000 than in 1990.

As is the case with Amesbury residents, persons that work in Amesbury appear to be traveling farther to their jobs in town.

Table T-3A
1990 and 2000 Place of Residence Data for Persons Working in Amesbury

Place of Residence	1990	2000	Percent Change
Amesbury	2,077	1,985	-92
Haverhill	310	297	-13
Newburyport	265	309	44
Salisbury	219	209	-10
Merrimac	197	179	-18
Seabrook, NH	139	133	-6
Exeter, NH	133	88	-45
Newbury	103	40	-63
West Newbury	93	44	-49
Lawrence	60	126	66
South Hampton, NH	58	58	0
Lynn	10	69	59
Others	<u>1,324</u>	<u>1,638</u>	<u>314</u>
TOTAL	4,988	5,175	187

Data from the 2000 Census is available regarding the mode of transportation used by Amesbury residents to travel to their place of employment, as shown in Table T-4.

Table T-4
2000 Commuting to Work Travel Mode Data

Travel Mode	Essex County			Amesbury		
	# Of Workers	% Of Workers	Change from 1990	# Of Workers	% Of Workers	Change from 1990
Drove Alone	270,604	78.7	7.4 %	6,925	82.2	19.5 %
Carpooled	32,332	9.4	-9.6 %	833	9.9	-0.2 %
Public Transportation	16,820	4.9	21.9 %	155	1.8	46.2 %
Walked/Bicycled	10,237	3.0	-23.7 %	158	1.9	-46.6 %
Other	2,355	0.7	13.8 %	44	0.5	-27.9 %
Worked at Home	11,283	3.3	45.0 %	306	3.6	54.5 %
Total	343,631	100.0		8,421	100.0	

Table T-4 shows that a large majority of Amesbury residents drive alone in their cars and trucks to get to work. The percentage of persons doing so is slightly higher than

the Essex County average (78.7%) and can be explained in part by the fact that so many residents work in communities within the Merrimack Valley where there is limited transit service available, and also work in other communities along the North Shore where there is no direct and convenient transit service available. The number of Amesbury residents carpooling to and from work has remained somewhat flat since 1990. While there was a nearly 20 percent increase in residents who drove alone to and from their place of employment, since 1990, there was also a nearly 50 percent increase in those residents using transit to travel to and from work. This may be explained by new MBTA commuter rail service to Boston from Newburyport, introduced to this part of the region in 1998, and increased ridership on the MVRTA intercity buses (Routes 01, 41, and 51) between Lawrence, Haverhill, and Newburyport, via Amesbury. There was a nearly 50 percent drop in those who walked or bicycled to and from work, since 1990. However, this trend may reverse itself, with the completion of the Powow Riverwalk and bike path.

Inventory of Existing Transportation Facilities and Services

Amesbury's existing transportation network is shown on the Transportation Map. A description of the existing facilities and services is described in the following sections.

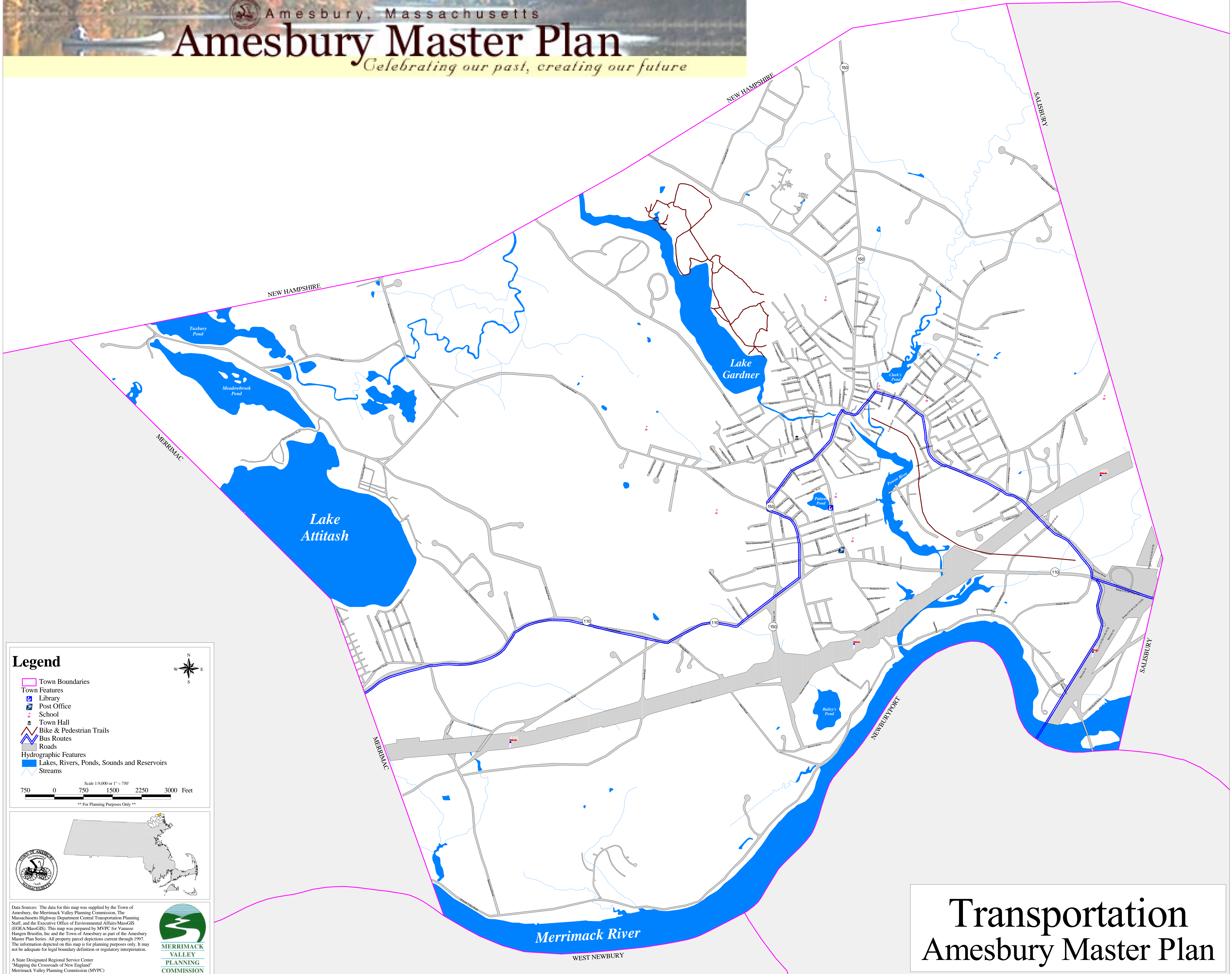


Roadway Network

Roadway Classification

Roadways are generally classified into one of three functional categories: arterials, collectors, and local roads. Arterials provide the highest level of service, providing the greatest speed over the longest uninterrupted distance. Collectors provide a less highly developed level of service at lower speeds at shorter distances. Collectors generally collect traffic from local roads and deliver it to arterials. Local roadways provide access to abutting land uses with little or no through capability.

Roadways in Amesbury are classified by their function. Roadways identified as arterials or collectors are eligible for federal transportation funding for improvements. As mandated by the Federal Highway Authority (FHWA), the MassHighway's Bureau of Transportation Planning and Development, with input from Amesbury officials and MVPC, has determined the functional classification of roadways within the community. The most recent realignment of the Federal-aid system of roads within Amesbury occurred in 1993, due to the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and due to the moving of Federal-aid Urban boundaries from the results of the 1990 U.S. Census of Population. The boundaries for Urban areas will be again moved in 2003 due to the results of the 2000 Census.




Legend

- Town Boundaries
- Town Features
 - Library
 - Post Office
 - School
 - Town Hall
 - Bike & Pedestrian Trails
 - Bus Routes
 - Roads
- Hydrographic Features
 - Lakes, Rivers, Ponds, Sounds and Reservoirs
 - Streams

Scale 1:9,000 or 1" = 750'

750 0 750 1500 2250 3000 Feet

** For Planning Purposes Only **



Seal of the Town of Amesbury, Massachusetts

Data Sources: The data for this map was supplied by the Town of Amesbury, the Merrimack Valley Planning Commission, the Massachusetts Highway Department Central Transportation Planning Staff, and the Executive Office of Environmental Affairs/MassGIS (EG&A/MassGIS). This map was prepared by MVPC for Vannase Hangen Brustlin, Inc. and the Town of Amesbury as part of the Amesbury Master Plan Series. All property parcel depictions current through 1997. The information depicted on this map is for planning purposes only. It may not be adequate for legal boundary definition or regulatory interpretation.

A State Designated Regional Service Center
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Merrimack Valley Planning Commission (MVPC)
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MERRIMACK VALLEY PLANNING COMMISSION

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Transportation Amesbury Master Plan

All roads in Amesbury are within a Federal-aid Urban area. According to the realigned Federal-aid system, within Amesbury, there are approximately 5.20 centerline miles of interstate highway, 1.96 miles of other principal arterials, 12.54 miles of minor arterials, and 13.72 miles of collectors. The remaining roadways, which make up the bulk of the roadway mileage, are local roads. Table T-5 provides a listing of all roadways other than local ones and their associated functional class.

There are approximately 5.20 miles of interstate highway that run through Amesbury, which are part of the Federal-aid system called the National Highway System (NHS), including 1.13 miles of Interstate 95 (I-95) and 4.07 miles of Interstate 495 (I-495). The 1.04 mile long section of Macy Street (Route 110) between I-495 and I-95 at the Salisbury Town Line is also part of the NHS system. Federal funding from the Surface Transportation Program (STP) is available for improvement projects on all of the remaining arterials and all of the collectors listed above in Amesbury. Also I-495 and I-95 can be repaired with Interstate Maintenance (IM) funding, bridges on the federal-aid system can be repaired or replaced with Bridge funding, and projects that alleviate congestion on federal-aid roadways are eligible for Congestion Mitigation and Air Quality Improvement (CMAQ) funding. Federal funding for these programs were authorized for six years in the Transportation Efficiency Act for the 21st Century (TEA21) legislation of 1998. Capital improvement projects on all arterials and collectors in Amesbury are also eligible for state-aid to round out the funding. Likewise, all Town-accepted local roads are eligible for reimbursement for preservation, construction, or capital improvement projects under the Massachusetts General Law (MGL) Chapter 90 state-aid program through the state's Transportation Bond Issue, which is reenacted by the state legislature every two to three years.

Roadway Jurisdiction

Most roadways in Amesbury are under one of two jurisdictions: MassHighway and the Town of Amesbury. All of Interstates 95 and 495, Route 110 (Haverhill Road and Macy Street), and Merrill Street are owned and maintained by the state. Some sections of highways and arterials are owned by the state including: Route 150 from Beacon Street to Route 110, Evans Place from Main Street to the Merrimack River edge, and Elm Street from Route 110 to Monroe Street. The sections of Main Street and Middle Road that are underneath I-495 overpasses and a small section of Old Merrill Street that lies between Merrill Street and I-95, near the Route 110 interchange, are also within the state right-of-way. All other roads are under local jurisdiction or are privately maintained.

Table T-5
Functional Classification of Amesbury's Roads

Functional Class	Roadway	Length (Miles)
Interstate	Interstate 95	1.13
	Interstate 495	4.07
Other Princ. Arterial	Route 110 (Macy Street) from I-495 to Salisbury Line	1.04
	Merrill Street	0.52
	Evans Place from Merrill Street to Newburyport Town Line	0.40
Minor Arterials	Route 110 (Macy Street) from Haverhill Road to I-495	0.53
	Route 110 (Haverhill Road)	2.64
	Beacon Street	0.40
	Elm Street	1.73
	Evans Place from Merrill Street to Main Street	0.21
	Main Street from Sparhawk Street to Evans Place	2.03
	Merrimac Street	0.45
	Monroe Street	0.87
	Route 150 (Market Street)	1.87
	Route 150 (Main Street) from Sparhawk Street to Elm Street	0.30
	Route 150 (Sparhawk Street)	0.35
	Route 150 (Hillside Avenue)	0.41
	Route 150 from Route 110 to I-495	0.45
	Route 150 Extension from I-495 to Beacon Street	0.30
Collectors	Buttonwood Road from Middle Road to Hunt Road	0.03
	Clarks Road	0.50
	Clinton Street from Route 150 to Congress Street	0.58
	Congress Street from Elm Street to Clinton Street	0.60
	Friend Street	2.64
	Greenleaf Street	0.23
	Highland Street from Friend Street to Greenleaf Street	0.39
	Hunt Road from Buttonwood Road to Route 150	1.73
	Kimball Road from Route 110 to Friend Street	1.42
	Middle Road	1.52
	Pleasant Valley Road	2.55
	School Street	0.11
	South Hampton Road	1.42
Total Length		33.42

There are a total of approximately 73.32 centerline miles of roadway in Amesbury, according to the 1997 Road Inventory File, produced by MassHighway. Approximately 12.06 miles of roadway are under state jurisdiction (or approximately 16.5 percent), 60.53 miles are Town-accepted roads, and 0.73 miles are unaccepted roads. A 2002 Road Inventory Report, published by MassHighway, indicates that an additional 0.12 miles of previously unaccepted roadway have been accepted as public ways and that there was a net increase 0.05 miles of unaccepted roads for a new total of 73.49 centerline miles. On a lane-mile basis, approximately 27 percent of the roadway mileage is under state jurisdiction. Table T-6 provides a summary of roadway jurisdiction in Amesbury and the number of lane miles.

Table T-6
Jurisdiction of Amesbury's Roads

Jurisdiction	Functional Class	Length[*]	Lanes^{**}	Lane Miles
State	Interstate	4.12	6	24.72
	Interstate	1.08	4	4.32
	Other Principal Arterials	1.80	2	3.60
	Minor Arterials	4.82	2	9.64
	Collectors	0.04	2	0.08
	Local	0.20	2	0.40
Local/Accepted	Other Principal Arterials	0.16	2	0.32
	Minor Arterials	7.72	2	15.44
	Collectors	13.72	2	27.44
	Local	33.88	2	67.76
	Local	5.05	1	5.05
Private/Unaccepted	Local	0.34	2	0.68
	Local	0.39	1	0.39
Total Length		73.32		159.84

* Source: Road Inventory File - 1997, MassHighway. Length is in miles.

** Source: Road Inventory File - 1997, MassHighway.

Roadway Traffic Volumes

MassHighway and MVPC maintain a database of daily traffic volumes for roadways in Amesbury. Table T-7 presents a historical summary of the Average Daily Traffic (ADT) volumes for the roadways in Amesbury. All of the roadways listed are part of the Federal-aid system and are functionally classified as either collectors or arterials. The historical traffic volume data presented for the arterial roads, including Interstate 495, Routes 110 and 150, and Evans Place, shows traffic growth that can be attributed to development both within Amesbury and in through traffic generated from surrounding communities. The historical volume data presented for the collector roads shows traffic growth that is for the most part attributed to development within Amesbury only. Traffic volume data presented for I-495 represents annual average daily traffic (AADT) volumes

that reflect actual yearlong data gathered by permanent count stations, which are maintained by MassHighway. Consequently, traffic volumes on I-495 during the months of July and August are much higher than the AADT volumes presented in Table T-7.

Table T-7
Historical Average Daily Traffic on Amesbury's Roads

Roadway	Location	Average Daily Traffic (ADT)*							
		1996	1997	1998	1999	2000	2001	2002	2003
I-495	at Merrimac line	<i>52,760</i>	<i>54,833</i>	<i>57,137</i>	<i>58,440</i>	<i>59,625</i>	<i>60,549</i>		
	north of Route 150	<i>49,360</i>	<i>52,264</i>	<i>53,517</i>	<i>55,069</i>		<i>57,310</i>		
	at Salisbury line	<i>35,332</i>	<i>37,203</i>	<i>38,715</i>	<i>40,108</i>	<i>40,668</i>	<i>42,306</i>		
Route 110	at Merrimac line				7,057		6,418		
	west of Main St.			9,442					14,490
	west of I-495		17,012						15,437
	east of I-495	27,387		30,336	30,329		29,566	35,531	35,925
Route 150	south of I-495	1,812					1,768		
	north of I-495			8,654				9,053	
	north of Route 110	8,855	9,356						
	west of High Street				8,779				
	north of Fern Ave.			3,334				2,676	
Evans Place	at Newburyport line	13,265			19,202				
Merrill St.	south of Old Merrill	10,109						3,195	
Elm St	east of Water Street	14,324			12,650			13,470	
	north of Route 110			13,753					
Main Street	south of Route 110		2,910						2,996
	north of Noel Street						8,829		
Merrimac St.	west of Main Street			3,058					2,293
Monroe St.	north of Elm Street		3,258				3,146		
Clark's Road	south of Route 110		3,748					2,770	
Congress St.	north of Warren Av.				6,992				
Friend Street	east of Newton St.			3,324					
	west of Main Street			9,442			7,825		
Greenleaf St.	south of Friend St.			3,000					4,296
Highland St.	north of Route 110	2,556						3,396	
	south of Friend St.			3,487					3,416
Kimball Rd.	north of Route 110			2,126					2,114
Middle Road	at Merrimac line	1,334						1,284	
Rocky Hill Rd.	south of Route 110								933
School Street	north of Main St.				6,226				
S. Hampton	south of Fern Ave.	3,918							

* Average daily traffic volumes in vehicles per day (vpd).

Note: Volumes not italicized are average weekday daily traffic volumes from MVPC. Volumes in italics are average annual daily traffic volumes provided by MassHighway.

Gateway Roadways

There are five major roadways that serve as gateways to Amesbury's central business district, two of which are currently in design. These gateways play an important role in giving first impressions to visitors of the Town by the quality of their character, their adjacent land use, and their level of service. Route 150 and Elm Street are currently in the preliminary design stages for improvements. Main Street, Market Street and Friend Street are the three other gateways to the downtown district. Future improvement designs to improve a gateway's capacity or level-of-service should consider the balancing design criteria of the preservation of the roadway's character and adjacent land uses.



Pedestrian Linkages

Sidewalks

Sidewalks adjacent to roadways serve pedestrians traveling to and from densely developed residences, businesses, and public gathering places within the downtown area. According to the road inventory file, compiled by MassHighway in 1997, and observations of aerial photographs taken in 2001, as well as field visits in 2003, the following roadways that are within the Central Business District (CBD) and that are functionally classified as arterials or collectors have sidewalks on both sides of the road:

- Hillside Avenue (Route 150)
- Sparhawk Street (Route 150)
- Main Street, from the bridge over I-495 to Elm Street
- Elm Street, from Main Street to Rocky Hill Road
- Market Street (Route 150), from Main Street to Hill Street
- Congress Street, from Elm Street to Gardner Street
- Friend Street, from Main Street to Whitehall Road
- High Street, from Main Street to Whitehall Road
- Whitehall Road, from Friend Street to Whittier Avenue
- Highland Street
- School Street
- Southampton Road, from Market Street 0.14 miles north

Community Trails

In addition to the sidewalk facilities identified above, there are off-road trails that are available for pedestrian use in the community. Foremost among these is the Powow Riverwalk which, when completed, will connect Main Street in the downtown area with Carriagetown Plaza on Route 110 via the old B&M Railroad right-of-way. Phase II of this trail was completed in the fall of 2001 and includes that section of the project between the Lower Millyard and Carriagetown Plaza. The design for Phase I of the project, which would extend the trail from its current terminus in the Millyard

to Main Street, is complete and the Town is working with MassElectric to bring this segment of the project to construction.

In addition to the Powow Riverwalk, there are a number of trails located in and around the almost 1,300 acres of recreational areas, town parks and conservation land located in the town. Key parcels include the Battis Farm, Woodsom Farm, Town Forest, Camp Kent and Powow River Conservation Area. The trails in two of these areas have been mapped by the Merrimack Valley Planning Commission. These are the Town Forest, located off Kimball Road and the Powow River Conservation Area, located on the eastern shores of Lake Gardner.



Bicycle Transportation

Bicycling provides a healthy, environmentally sensitive means of transportation for community residents of virtually all ages and is a primary means of transportation for many teenage residents. With parking availability in the downtown area a major concern, provision of adequate bicycle facilities, such as bike racks/lockers and bicycle routes into the downtown could play an important role in reducing automobile travel to this area. Establishing bicycle routes elsewhere in the community could also improve access to other educational and recreational sites and provide connections to surrounding communities.

Amesbury has begun construction of the Powow Riverwalk and Bicycle Path along the banks of the Powow River. Construction of Phase II of the project was completed in 2001. The path uses an old railroad right-of-way along the east side of the River and connects the Lower Millyard of downtown Amesbury with the Carriage Town Market Place shopping plaza on Route 110 in an aesthetically pleasing manner. Phase I of the project will begin once construction and final design issues have been worked out. Phase I of the project will connect the completed section of the Riverwalk with the downtown area and includes a crossing of the Powow River along Main Street near Market Square, with boardwalks cantilevered off of the adjacent mill buildings. Ultimately, additional plans to use the old railroad right-of-way, which is parallel with and north of Route 110, will result in a connection to a path that leads to Salisbury.

There are currently no on-road bicycle routes identified and signed within the community. However, the Merrimack Valley Metropolitan Planning Organization's 2003 Regional Transportation Plan has identified eight potential bicycle routes that might be developed. The following three routes were identified on the 1986 Massachusetts Bicycle Map that was developed by the Massachusetts Highway Department and the Central Transportation Planning Staff:

- Route 150 from the New Hampshire state line south to Pleasant Valley Road;
- South Hampton Road from the New Hampshire state line to Route 150; and

- Pleasant Valley Road/Merrimac Street/Main Street to the Newburyport City Line.

South Hampton Road (Route 107A) would provide a connection to a regional bicycle route that is identified by the New Hampshire Department of Transportation. Pleasant Valley Road is one of the most scenic stretches of roadway in the Merrimack Valley region and is a route frequently used by bicyclists living in town, from surrounding communities, and from outside the area.

Another five routes, identified below, were recommended for further consideration in terms of developing a safe and effective on-road bicycling network:

- **Route 110** from Merrimac town line to Salisbury town line
- **Lake Attitash Road** from Route 110 to its intersection with Lion's Mouth Road
- **Lions Mouth Road** from Lake Attitash Road to Friend Street
- **Friend Street** from Highland Street to Route 150
- **Whitehall Road** from Route 150 to New Hampshire state line

Lake Attitash Road, Lion's Mouth Road and Friend Street would provide bicycle access between Lake Attitash and Woodsom Farm and the downtown area. **Route 110** would accommodate bicycle transportation along the busiest roadway in the community and the primary means of accessing Salisbury Center and Salisbury Beach.



Parking

The parking supply and demand characteristics in the downtown described below were studied on a weekday in December 2001 as part of the Amesbury CBD Parking Study, prepared by MVPC in 2002. This is the most recent data available on parking supply and demand in the downtown area. The MVPC study reviewed existing parking conditions and made estimates of future parking demand based on anticipated development/redevelopment in the study area as identified by the town's Office of Community and Economic Development. Given the importance of parking availability to the vitality of the downtown, the town should consider a monitoring program or even updating the study given the amount of change that is occurring in the area, and is expected to take place in the coming years.

Existing Parking Supply

According to the study, Amesbury's downtown area has approximately 651 public parking spaces: 156 on-street spaces and 495 off-street spaces. There are also approximately 256 privately owned parking spaces that serve as parking explicitly for the commercial and residential land uses nearest them, and approximately 242 parking spaces that serve as parking for the non-profit institutions of Amesbury.

On Street Parking

There are approximately 156 on-street parking spaces within downtown Amesbury. All of the spaces, which are on Town roads, are striped for cars to park parallel with the curb. Tables T-8 presents a summary of the parking space supply on downtown streets.

Table T-8
Summary of On Street Parking Spaces

Street, Section	No. of Spaces
Main Street, from Friend Street to Aubin Street	21
Main Street, from Aubin Street to School Street	23
Market Square	26
Friend Street, from Main Street to eastern Upper Millyard lot drive	18
Friend Street, from eastern Upper Millyard lot drive to School Street	23
Market Street, from Market Square to Fruit Place	22
Water Street	11
School Street	12
Total	156

Off Street Parking: Public Spaces

There are approximately 495 public parking spaces located downtown on surface lots and parking structures. Most all of the spaces are unrestricted for parking duration, with the one exception of a section of the Upper Millyard parking lot, which is restricted to 2-hour parking. Table T-9 presents a summary of the parking spaces in Town parking lots that are open to the general public.

Table T-9
Summary of Off Street Public Parking Spaces

Parking Lot, Section	No. of Spaces
Upper Millyard Parking Lot, 2 hour limit section	44
Upper Millyard Parking Lot, No limit – street side	43
Upper Millyard Parking Lot, No limit – mill side	51
Town Hall Parking Lot	42
Water Street Garage, Upper Deck	104
Water Street Garage, Lower Deck	26
Water Street Surface Lot	69
Congregational Church and Public Library Lot	75
Main Street Parking Lot, Public Spaces*	41
Total	495

* Includes 28 marked spaces and approximately 13 unmarked spaces.

Existing Parking Demand

The study also included a survey of parking supply occupancy downtown, which was conducted on Thursday, December 20, 2001 during the peak parking demand period between 2:00 and 6:00 PM and on Friday, December 21, 2001 at 6:00 AM as determined by MVPC, officials of the Amesbury Office of Community and Economic Development, and the Alliance for Amesbury. As noted above under Existing Parking Conditions, the Town should consider an ongoing effort to monitor parking conditions within the area.

Results of the December, 2001 survey indicated that the peak parking demand occurred around 3:30 PM, at which time approximately 80 percent of the on-street parking and approximately 50 percent of the public off-street parking supply was used. During the peak parking period of the day, there were approximately 276 public parking spaces unoccupied: 32 parking spaces on street and 244 parking spaces off-street.

Some of the on-street parking areas reached capacity, including: Market Square, Water Street, Market Street and the eastern sections of Friend and Main Streets. Capacity problems were isolated for the off street public parking spaces. Only the Main Street parking lot and a section of the Upper Millyard parking lot were approaching capacity or at capacity. The most preferred area for short-term parkers was Friend Street, from the eastern Upper Millyard lot driveway to Main Street, and the most preferred area for long-term parkers was the Main Street lot.

Parking areas close to residential buildings had the most vehicles parked overnight. Since the Main Street lot is near some residences, approximately 56 percent of the public parking supply in the lot was occupied overnight.



Bridge Conditions

MassHighway maintains an inventory of bridges throughout the state with periodic and regular inspections of their conditions.

Table T-10 lists the bridges within Amesbury that are considered to be up to today's standard for functionality and are considered to be structurally sufficient by the AASHTO rating, according to MassHighway's Bridge Listing, published in July of 2003. A summary of the AASHTO rating methodology may be found in the Transportation Improvement Program section of this chapter.

Table T-10
Structurally Sufficient Bridges within Amesbury that meet Functional Standards

Bridge #	Over	Under	Owner	Functional Class	Year Built	Year Rebuilt	AASHTO Rating
A-07-001	Newton Road	Powow River	Town	Local	1995		83.0
A-07-002	Newton Road	Powow River	Town	Local	1994		93.5
A-07-003	High Street	Powow River	Town	Local	1995		80.7
A-07-006	Elm Street	Back River	Town	Minor Arterial	1860		92.1
A-07-007	Clinton Street	Back River	Town	Collector	2001		81.3
A-07-009	Main Street	Powow River	State	Minor Arterial	1890	1998	75.0
A-07-018	I-95 NB	Route 110	State	Interstate	1967		89.0
A-07-018	I-95 SB	Route 110	State	Interstate	1967		90.7
A-07-019	I-95 SB	B&M railroad ROW	State	Interstate	1967		80.0
A-07-021	I-495 NB	Middle Road	State	Interstate	1964		88.1
A-07-021	I-495 SB	Middle Road	State	Interstate	1964		88.1
A-07-024	I-495 NB	Main Street	State	Interstate	1964		90.7
A-07-024	I-495 SB	Main Street	State	Interstate	1964		90.7
A-07-028	I-495 NB	Powow River	State	Interstate	1967		90.5
A-07-028	I-495 SB	Powow River	State	Interstate	1967		89.4
A-07-031	Route 110	Powow River	State	Minor Arterial	1967		93.8
A-07-032	County Road	Back River	Town	Local	1990		65.7

A bridge is functionally obsolete when the deck geometry, load carrying capacity, vertical or horizontal clearance, or approach roadway alignment is such that the bridge no longer meets the usual criteria for the system of which it is an integral part. For example, the travel lanes may be narrower than today's standard. Table T-11 lists the bridges within Amesbury that are considered functionally obsolete.

Table 11
Functionally Obsolete Bridges within Amesbury

Bridge #	Over	Under	Owner	Functional Class	Year Built	Year Rebuilt	AASHTO Rating
A-07-005	Main Street	Powow River	State	Minor Arterial	1850		65.1
A-07-008	Oak Street	B&M railroad ROW	Town	Local	1949		61.1
A-07-011	Pond Street	Powow River	Town	Local	1850		66.2
A-07-019	I-95 NB	B&M railroad ROW	State	Interstate	1967		78.1
A-07-019	I-95 NE ramp	B&M railroad ROW	State	Interstate	1967		74.5
A-07-023	I-495 NB	Route 150	State	Interstate	1967		69.0
A-07-023	I-495 SB	Route 150	State	Interstate	1967		69.8
A-07-025	I-495 NB	Route 110	State	Interstate	1964		69.0
A-07-025	I-495 SB	Route 110	State	Interstate	1964		69.0
A-07-027	Elm Street	I-495	State	Minor Arterial	1964		72.7

As mentioned previously, the functionally obsolete Oak Street bridge over the Powow Riverwalk trail, which is the old B&M right-of-way, is programmed within the 2004-2008 TIP to be replaced in the near term.

A bridge is structurally deficient when one or more elements of the bridge structure have deteriorated to a condition that makes the whole bridge structure deficient for its intended load bearing capability. A structurally deficient bridge may (1) be restricted to light vehicles only, (2) require immediate rehabilitation to remain open, or (3) be closed. Table T-12 lists the bridges within Amesbury that are considered structurally deficient, and their associated AASHTO ratings.

Table T-12
Structurally Deficient Bridges within Amesbury

Bridge #	Over	Under	Owner	Functional Class	Year Built	Year Rebuilt	AASHTO Rating
A-07-004	Thomson Street	Powow River	Town	Local	1913		7.0
A-07-010	Main Street	Merrimack River	State	Arterial	1850	1966	4.0
A-07-014	Main Street	Merrimack River	State	Arterial	1909	1938	16.5
A-07-015	R Street	Back River	Town	Local	1908		47.5
A-07-016	I-95	Merrimack River	State	Interstate	1954		21.0
A-07-017	I-95	Evans Place	State	Interstate	1954	1977	79.0
A-07-026	I-495 NB	B&M railroad ROW	State	Interstate	1964		35.0
A-07-026	I-495 SB	B&M railroad ROW	State	Interstate	1964		36.8

The two Main Street bridges over the Merrimack River and the R Street bridge over the Back River are programmed in the TIP to be replaced in the near term. The I-95 bridge over the Merrimack River is also programmed within the TIP to be reconstructed in the near term.



Public Transportation

Train Service

Commuter rail service to Boston is available to Amesbury residents at Newburyport station, located immediately west of the Route 1 and State Street traffic circle. The Newburyport station has surface parking lots with approximately 800 parking spaces, with the Massachusetts Bay Transportation Authority (MBTA) charging a parking rate of \$2 per day per space. The MBTA began commuter rail service to Newburyport in 1998, after the railroad tracks were refurbished between Ipswich and Newburyport. A latent demand for this service was met as indicated by boarding counts sampled by MBTA audits, which showed, for one weekday, daily commuter rail ridership counts of 838 in 1999 and 719 in 2000 from this station. A one-way ticket fare aboard the train to Boston (through eight zones) costs \$5, a twelve-ride pass costs \$55, and a monthly ridership pass from the station is \$159.

There are 13 daily train trips inbound to Boston from the station and 13 daily trips outbound from Boston. According to the MBTA's schedule, effective April 28, 2003, on a weekday there are five peak period inbound trains to Boston scheduled to leave Newburyport station at 5:27 AM, 5:55 AM, 6:30 AM, 7:00 AM, and 8:00 AM and scheduled to arrive at North Station between 65 and 67 minutes later. Conversely, there are five peak period outbound trains from Boston, scheduled to leave North Station at 4:30 PM, 5:10 PM, 5:37 PM, 6:45 PM, and 7:30 PM and scheduled to arrive at Newburyport station between 64 and 66 minutes later.

Bus Services

Currently, there is one private bus carrier that serves the community for commuter trips to and from Boston. This service is operated by the Coach Company, which provides two morning inbound bus trips to Boston from Friend Street in Amesbury and four evening outbound trips from Boston returning to Friend Street. Buses leave Friend Street at 5:50 AM and 7:18 AM and arrive in Boston approximately 90 minutes later with stops at Haymarket Square, Government Center, Park Street, Saint James Avenue, and Copley Square. Buses leave from Boston for Amesbury at 4:20 PM, 4:50 PM, 5:02 PM, and 6:40 PM. Ticket fares cost \$8.75 for a one-way fare, \$64 for a ten-ride pass, and \$123.25 for a 20-ride pass. Plans are currently in the works to construct a Transportation Center in the Lower Millyard, to be located off of Railroad Avenue, and which will serve both the Coach Company and the MVRTA buses. This station will help in facilitating transfers from one bus service provider to another in a coordinated and safe fashion. It will also relieve parking demand in the Upper Millyard Lot since there will be parking for patrons of both services available at the new facility.

The Town of Amesbury is a member of the Merrimack Valley Regional Transit Authority (MVRTA), which is the primary provider of local and regional transit service in the Merrimack Valley region. The MVRTA operates fixed route service between Newburyport and Haverhill via Amesbury aboard its Route 51 intercity coach bus. Connections can be made to Lawrence and Lowell, by way of Bus Routes 01 and 41, which this bus continues on through the Merrimack Valley. The bus operates Monday through Saturday and has an annual ridership of 72,381 according to the MVRTA. One-way ticket fares cost \$1 for adults, and 50 cents for children, 6 to 12. Ten-ride passes are available at a cost of \$9 and 31-day passes are available for \$27. According to the MVRTA schedule, effective July 1, 2003, there are 13 outbound trips from Haverhill leaving every hour on the hour between 6:00 AM and 6:00 PM. There are also 15 inbound trips from Newburyport to Haverhill on weekdays and there are 9 outbound trips and 8 inbound trips on Saturdays. Three outbound stops are made at the Newburyport MBTA station; two in the morning and one in the evening. There are scheduled stops in Amesbury on Highland Avenue at Greenwood Street, at Market Square downtown, and at the Stop and Shop plaza on Route 110. Table T-13 lists the times of buses departing from Haverhill, Amesbury, and Newburyport on weekdays.

Table T-13
MVRTA Bus Schedule

Haverhill	OUTBOUND			Newburypt	INBOUND			Haverhill
	Amesbury				Amesbury			
Washington Square	Highland/ Greenwood	Market Square	Stop & Shop	Plum Island	Stop & Shop	Market Square	Highland/ Greenwood	Washington Square
-	-	-	-	-	5:35	5:42	5:45	6:00
-	-	-	-	-	-	6:10	6:13	6:45
-	-	-	-	6:30	7:13	7:20	7:23	7:53
6:00 AM	6:25	6:28	-	7:20	8:06	8:14	8:27	8:47
6:45	7:15	7:18	7:23	8:25	9:11	9:19	9:22	9:52
8:00	8:30	8:33	8:38	9:25	10:11	10:19	10:22	10:52
9:00	9:30	9:33	9:38	10:25	11:11	11:19	11:22	11:52
10:00	10:30	10:33	10:38	11:25	12:11	12:19	12:22	12:52
11:00	11:30	11:33	11:38	12:25	1:11	1:19	1:22	1:52
12:00 PM	12:30	12:33	12:38	1:25	2:11	2:19	2:22	2:52
1:00	1:30	1:33	1:38	2:25	3:11	3:19	3:22	3:52
2:00	2:30	2:33	2:38	3:25	4:11	4:19	4:22	4:52
3:00	3:30	3:33	3:38	4:25	5:11	5:19	5:22	5:52
4:00	4:30	4:33	4:38	5:25	6:11	6:19	6:22	6:52
5:00	5:30	5:33	5:38	6:25	7:11	7:19	7:22	7:52
6:00	6:30	6:33	6:38	7:25	-	-	-	-

Source: MVRTA. Schedule effective July 1, 2003.

Transportation Network Safety

Increased traffic volumes, congestion, and traffic speeds are some factors that contribute to the increased incidence of automobile crashes and reduced safety of roadway users. Certain measures can be taken to increase safety of the roadway users, including:

- improving the design of highways and intersections, and
- increasing the enforcement of speed limits.

MassHighway publishes a list of the 1,000 highest crash locations within the state. Table T-14 lists those locations in Amesbury that made the list for the three-year period between 1997 and 1999, the latest period available.

Table T-14
Top 1000 High Crash Locations Report for Amesbury

Rank	Street	Intersecting Street	Tot.*	PD**	PI***	F+	Avg.++
242	Macy Street (Route 110)	Elm Street	55	36	19	0	131
274	Macy Street (Route 110)	Rocky Hill Road	35	19	16	0	99
278	Haverhill Road (Route 110)	Main Street	35	20	15	0	95

* Source: MassHighway. Total crashes occurring over the 3-year period: 1997 – 1999.

** Crashes involving property damage only.

*** Crashes involving personal injury.

+ Crashes involving fatalities.

++ Weighted Average; weighting of 1 point for property damage only, 5 points for personal injury, and 10 points for fatal.

As shown in Table T-14, intersections along Route 110 (Haverhill Road and Macy Street) are part of the high crash list, ranking between 242 and 278. Macy Street between I-495 and I-95 serves not only through traffic, but also serves as an interchange between I-95 to and from the south and I-495. On this section of Macy Street are the signalized intersection with Elm Street and the unsignalized intersection with Rocky Hill Road, both of which made the high crash location list. A small section of Macy Street was improved in 2000 with the construction and completion of the Carriagetown Marketplace. Design plans for the widening of the rest of Macy Street, between I-495 and I-95, are now complete. As shown earlier in Table T-2 of the Transportation Improvement Program section of this chapter, the widening project is programmed to get underway in Federal Fiscal Year 2007. Haverhill Road and Macy Street (Route 110) at its signalized intersection with Main Street was also on the MassHighway crash location list.

Historical traffic crash data was also obtained for the intersections in Amesbury from MassHighway computer files. The data was reviewed over a three-year period, from 1999 to 2001, to determine crash trends. Table T-15 provides a summary of the highest crash locations, defined as all those locations that experienced more than an average of 3 crashes per year.

Table T-15
Amesbury Intersection Crash Summary
Three Year Summary of the Highest Crash Locations (1999 to 2001)*

Intersection	Number of Crashes	Crash Type**					Severity***			Roadway Condition		
		CM	RE	HO	ROR HFO	Unkn/ Other	PD	PI	F	Dry	Wet	Ice
Route 110 at Elm Street	58	25	15	1	5	12	39	19	0	43	13	2
Route 110 at Rocky Hill Rd.	35	8	21	0	2	4	22	13	0	30	5	0
Route 110 at Route 150	35	22	8	2	1	2	25	10	0	27	8	0
Route 110 at Main Street	30	15	9	3	1	2	21	9	0	25	2	3
Route 110 at Highland Ave.	14	7	4	0	0	3	10	4	0	10	3	1
Elm Street at Monroe Street	13	7	5	0	1	0	9	4	0	12	1	0
Friend Street at Main Street	12	5	3	0	2	2	9	3	0	8	4	0
Friend Street at School Street	12	3	8	0	0	1	9	3	0	11	0	1
Evans Place at Merrill Street	11	1	7	0	2	1	6	5	0	7	2	2
Market Street at Clark Street	10	2	4	0	3	1	6	4	0	8	2	0
Elm Street at Congress Street	10	3	3	0	4	0	7	3	0	7	3	0

* Source: MassHighway crash database.

** Crash Type: CM = Cross-Movement or angle type; RE = Rear-End; HO = Head-On; ROR/HFO = Ran Off Road or Hit Fixed Object; and Unkn = Unknown type.

*** Crash Severity: PD = Property Damage only; PI = Personal Injury; F = Fatal.

The signalized intersections of Amesbury experiencing the highest numbers of crashes are:

- Route 110 (Macy Street) at Elm Street, with an average of 19.3 crashes per year;
- Route 110 (Haverhill Road) at Route 150, with an average of 11.7 crashes per year; and
- Route 110 (Haverhill Road) at Main Street, with an average of 10.0 crashes per year.

According to an analysis of the intersection data and as shown in Table T-15, the location with the highest number of crashes is Route 110 at Elm Street. This section of Route 110 between Interstate 95 and 495 is prone to congestion for several hours of the day, especially during the summer months. The intersection experienced a total of 58 crashes over a three-year period, or an average of approximately 19.3 crashes per year. Twenty-one of the 58 crashes, or approximately 36 percent, occurred during the summer season between June 20 and September 20. Over the three-year study period, this signalized intersection experienced approximately 25 angle-type collisions and 15 rear-end collisions. There were approximately 39 collisions involving property damage only and 19 collisions involving personal injury. Not shown in Table T-15 are the approximately 15 crashes (or approximately 26 percent) occurring during the evening peak period between 3:00 and 7:00 PM, which is a time of increased congestion.

Unsignalized intersections in Amesbury experiencing the highest numbers of crashes (greater than 3 per year) in order of frequency are:

- Route 110 (Macy Street) at Rocky Hill Road, with an average of 11.7 crashes per year;
- Route 150 (Hillside Avenue) at Highland Avenue, with an average of 4.7 crashes per year;
- Route 110 (Haverhill Road) at Highland Avenue, with an average of 4.7 crashes per year;
- Elm Street at Monroe Street, with an average of 4.3 crashes per year;
- Friend Street at Main Street, with an average of 4.0 crashes per year;
- Friend Street at School Street, with an average of 4.0 crashes per year;
- Evans Place at Merrill Street, with an average of 3.7 crashes per year;
- Market Street at Clark Street, with an average of 3.3 crashes per year; and
- Elm Street at Congress Street, with an average of 3.3 crashes per year.

Of interesting note is the fact that the intersection of Route 110 at Rocky Hill Road has many more rear-end type collisions than any other collision types, a condition atypical for unsignalized intersections. It may be that part of the reason for this is that during times of congestion, vehicles on Route 110 may be making quick stops to let turning traffic from Rocky Hill Road enter the traffic stream.

As part of this analysis, the number of crashes at intersections have also been reviewed against intersection traffic volumes, and then compared to the rate of crashes for other intersections. MassHighway indicates that in 2003, based on data for the most recent years, there is a statewide average rate of 0.87 crashes per million entering vehicles (mev) for signalized intersections, and 0.66 crashes per mev for unsignalized intersections. The intersections of Route 110 with Elm Street, Main Street, and Route 150 have a crash rates of approximately 1.40, 1.53, and 1.56 crashes per mev, respectively, rates that are approximately 60 to 80 percent higher than that of the statewide average rate for signalized intersections. The intersection of Route 110 at Rocky Hill Road has a crash rate of approximately 1.08 crashes per mev, a rate that is also approximately 65 percent higher than that of the statewide average rate for unsignalized intersections.

Specific design measures can be taken at intersections to improve and enhance safety. Some of these measures include: signalization to control traffic at a congested intersection in a more orderly fashion, widening intersections for the provision of turn lanes to allow through traffic to bypass vehicles waiting to turn, and realigning intersecting roads or grading corners to improve corner sight distances. As with other roadway improvement projects, engineering studies must be conducted prior to these projects to weigh the positive and negative impacts of proposed changes

against each other. All studies and designs should consider accommodation of pedestrians and bicyclists, two groups that often share the roadways with automobiles, especially during the summer months. Providing better facilities for these users will also improve the safety of automobile drivers as well.

Crashes Involving Pedestrians

According to the MassHighway crash data files, over the three-year period between 1999 and 2001, there have been ten recorded crashes involving pedestrians in Amesbury, all but one of which involved personal injury. Crashes seemed to be concentrated along Route 110, Main Street, and Friend Street. Seven of the ten accidents occurred on roadways in and around downtown locations that have sidewalks on both sides; the remaining occurred at locations outside the downtown area that had a sidewalk on one side of the roadway. The MassHighway crash data also indicates that there have been eight recorded bicycle crashes over that same time period, seven of which involved personal injury. Seven of the crashes occurred between the months of May and September, and one occurred in December. All of the bicycle crashes occurred at different locations, however three of the crashes occurred in the vicinity of Market Square.

Analysis of Existing Congested Transportation Facilities

Existing traffic volumes on the arterial roads in Amesbury, such as Route 110 and Route 150, vary by season. According to data from MassHighway's Permanent Count Station #12, located on Route 110 in nearby Haverhill, daily traffic volumes in July and September are approximately 5 and 6 percent higher, respectively, than the annual average daily traffic (AADT) volumes. However, traffic volumes may vary by even more than this amount on some of Amesbury's arterials. For example, the section of Route 110, east of I-495, serves interstate traffic, which varies significantly by time of year, and traffic to and from Salisbury Beach, which is at its peak during the summer months.

Anecdotal, through interviews and public workshops, residents have brought up the impact of cut-through traffic through neighborhoods to bypass congested locations. It is recommended that the Town initiate studies and action items to document and address these concerns.

Listed below is a detailed existing conditions inventory of geometry and traffic volumes for the most congested locations in Amesbury, as identified by Town officials. The data was then used to analyze the operations of those locations.



Geometrics

Roadways

Route 110 is a two-lane east/west arterial through Amesbury that is owned and maintained by the state. The roadway parallels Interstate I-495, to the south, and consists of one travel lane plus a paved shoulder, 1- to 3-feet in width and delineated by a painted single white solid edge line, in each direction. A painted double yellow centerline separates the two travel lanes over its entire length in Amesbury. Land uses adjacent to Route 110 consist primarily of commercial developments. There are four traffic signals at intersections on Route 110 in Amesbury: one at its intersection with Hillside Avenue (Route 150), one at its intersection with Main Street, one at its intersection with the Carriage Town Plaza driveway, and one at its intersection with Elm Street and Clarks Road.

Intersections

Haverhill Road (Route 110) at Hillside Avenue (Route 150)

Hillside Avenue and Route 150 intersect Haverhill Road (Route 110) from the north and south, respectively, to form a four-legged, signalized intersection. While Route 150 runs north/south, the section of Route 110 near this intersection has more of a northeast/southwest alignment. Route 110 intersects Route 150 at an acute angle of between 40 and 50 degrees. Both of the Route 110 approaches to the intersection consist of one 17- to 19-foot wide travel lane that allows through vehicles to bypass queued left-turning vehicles, but only when the left-turning vehicles are stacked close to the painted centerline. Right-turning vehicles are channelized onto Route 150 from Route 110 in both directions by very large, grass-covered delta-shaped traffic islands, which are approximately 8,000 to 9,000 square feet (sf) in size. Likewise, left-turning vehicles from Route 150 onto Route 110 may bypass the traffic signal by staying left of the large traffic islands on a two-lane "ramp". The left-turning vehicles from Route 150 are separated from the vehicles turning right from Route 110 by a painted double yellow centerline along the ramps and smaller grass-covered triangular-shaped islands (approximately 1,000 sf in size) at their intersections with Route 110. The left-turning vehicles are under STOP-sign control on this approach. The Route 150 northbound approach to the traffic signal consists of one lane that tapers out to approximately 20 feet in width near the intersection. The Hillside Avenue (Route 150 southbound) approach consists of one 16-foot wide lane used by through vehicles and right-turning vehicles. Traffic at the intersection is controlled by a two-phase, fully actuated signal. Signal heads are mounted on mast arm supports as well as posts. Curb cuts exist on Route 110 and Route 150 at the intersection for two land uses in the northwest corner: Amesbury Auto Sales, with two driveways (one of which is blocked by parked automobiles that are for sale) onto Hillside Avenue and Delahunty Nurseries and Florist, with a driveway onto Haverhill Road. Corner land uses with access somewhat removed from the

intersection include the Andyman Dessert & Baking Company on the northeast corner, St. Joseph Cemetery on the southeast corner, and Merrimack Valley Animal Hospital on the southwest corner.



Traffic Volumes

The Merrimack Valley Planning Commission gathered traffic volume data for the congested locations described above in 2002 and 2003. Daily traffic volumes were obtained by Automatic Traffic Recorders (ATRs), which were placed on Route 150 (Hillside Avenue), north of Route 110 in September of 2002 and on Route 110 (Macy Street) east of I-495 in May and September of 2003. Weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) commuter peak period turning movement and classification counts (TMCs) were conducted at the intersection of Route 110 (Haverhill Road) at Route 150 (Hillside Avenue) in July of 2003.

Table T-16 presents the daily and peak hour traffic volumes on Route 150, north of Route 110 and on Route 110, east of I-495.

Table T-16
Traffic Volume Summary

Location	Date of Count	Average Weekday Daily Traffic Volume*	Peak Hour	Peak Hour Traffic Volume**	K-Factor***	Directional Distribution
Route 150, north of Route 110	September 2002	9,100	Morning	559	6.1	59% southbound
			Evening	757	8.3	65% northbound
Route 110, east of I-495	May 2003	35,900	Morning	2,546	7.1	60% eastbound
			Evening	2,816	7.8	53% westbound

* Average Weekday Daily Traffic (AWDT) volume in vehicles per day (vpd). September volumes on Route 150 were increased approximately 1 percent to reflect July's average traffic volumes, to remain seasonally consistent with the peak period TMC data.

** Peak hour traffic volume in vehicles per hour (vph).

*** K-Factor is the percent of daily traffic occurring during the peak hour; expressed as a percentage.

As shown in Table T-16, Route 150 carries approximately 9,100 vehicles per day (vpd) on an average weekday north of Route 110. The predominant direction of travel is southbound during the weekday morning peak hour and northbound during the weekday evening peak hour. As evidenced by the directional distributions on Route 150, much of the commuter traffic is destined to arterials to the south, including I-495, during the morning peak hour. Conversely, during the evening peak hour, much of the commuter traffic is originating from arterials to the south, principally I-495.

Seasonal Variation of Traffic on Macy Street (Route 110) between I-495 and I-95

Macy Street (Route 110), between Interstates 95 and 495, is a principal arterial that is part of the National Highway System and is an integral part of the interchange between these two interstate highways. Traffic on this section of Macy Street can vary by time of year more so than any other two-lane roadway in Amesbury. The roadway not only serves traffic to and from southern points along Interstates 495 and 95, which has interstate traffic that can vary tremendously by time of year, but it also serves as an access to beaches, primarily Salisbury Beach, which attracts visitors mainly during the summer months.

The monthly variation of traffic volumes on Macy Street was estimated by an analysis of daily traffic volumes gathered at permanent count stations, which are maintained by MassHighway on roadways surrounding Macy Street. This analysis was necessary, since there is no permanent counting station that monitors traffic volumes year-round on this section of Macy Street. Monthly daily traffic volumes from 2001, the latest year available, were used in the analysis. Daily traffic volume counts from MassHighway permanent count station numbers 5238 and 5241, which are located on I-495 south and north of the Route 110 interchange in Amesbury, respectively, were used to determine the variation of the regional and interstate traffic using the Route 110 ramps to and from Interstate 495. The traffic on the Macy Street arterial, between Interstates 495 and 95, serves a combination of intercommunity, regional, and interstate traffic. Table T-17 presents the monthly variation of traffic on Interstate 495 and the I-495 ramps with Route 110, which provide somewhat of an estimation of the monthly variation of traffic on Macy Street.

Table T-17
Estimation of Seasonal Variation on Route 110 (Macy Street), east of I-495*

Month	I-495, south of Rt. 110***		I-495, north of Rt. 110+		I-495 ramps with Rt. 110++	
	ADT	% of AADT	ADT	% of AADT	ADT	% of AADT
January	42,408	74 %	32,712	77 %	9,696	65 %
February	44,845	78 %	32,685	77 %	12,160	81 %
March	46,320	81 %	31,360	74 %	14,960	100 %
April	52,307	91 %	37,819	91 %	14,488	97 %
May	61,000	106 %	47,000	111 %	14,000	93 %
June	67,995	119 %	49,791	118 %	18,204	121 %
July	77,751	136 %	57,909	137 %	19,842	132 %
August	77,800	136 %	58,820	139 %	18,890	126 %
September	60,164	105 %	44,691	106 %	15,473	103 %
October	56,305	98 %	41,089	97 %	15,216	101 %
November	51,911	91 %	38,382	91 %	13,529	90 %
December	48,843	85 %	35,409	84 %	13,434	90 %
AADT**	57,310		42,306		15,004	

* Source: MassHighway. ADT = Average Daily Traffic volume data (from 2001).

** AADT = Annual Average Daily Traffic volume in vehicles per day.

*** MassHighway Permanent Count Station #5238 = Interstate 495 in Amesbury, north of Route 150.

+ MassHighway Permanent Count Station #5241 = Interstate 495 in Amesbury, at the Salisbury Town line.

++ The daily traffic on the I-495 ramps with Route 110 is the difference in volumes between Stations #5238 and 5241.

As shown in Table T-17, traffic volumes on I-495 were approximately 36 to 39 percent higher during the summer months of July and August than the annual average, according to data gathered at the permanent count station numbers 5238 and 5241 during the year 2001. The difference between the traffic volumes at these two stations is the traffic volume on the ramps between Route 110 and I-495. The regional and interstate traffic on these ramps were between 26 and 32 percent higher during the months of July and August than the annual average. The seasonal variation on Macy Street, between I-495 and I-95, most likely approximates the variation of ramp volumes. According to the analysis, traffic volumes on Macy Street approximate average annual conditions during the months of April, May, September, and October. Traffic volumes on the I-495 ramps with Route 110, which vary much like traffic volumes on Macy Street, are estimated to be between 21 and 36 percent higher during the summer months of June, July and August than the annual average. This is probably a high estimate in variation, since a large component of the traffic on Route 110, west of the I-495 interchange has local commuter traffic, which has little seasonal variation and therefore will have a more “normalizing” effect on the estimated total.

After the Chain Bridge closed on May 6, 2002, local traffic that would otherwise be on Main Street and Evans Place to travel to and from Newburyport via the bridge was diverted primarily onto Macy Street. This traffic traveled over the Whittier Bridge on Interstate 95, instead, to make the river crossing. On July 3, 2003, the Chain Bridge reopened to traffic. As shown earlier in Table T-7, Merrill Street carried approximately 10,100 vpd in 1996, prior to the bridge closing, and it carried only 3,200 vpd in 2002, after the bridge closing.



Operations Analysis Methodology

The operations of the signalized intersection of Route 110 at Route 150 were conducted by the methodology presented in the 2000 Highway Capacity Manual.

Level of Service

A primary result of operations analyses is the assignment of level of service (LOS) to traffic facilities under various traffic flow conditions. Level of service is a qualitative measure describing operational conditions within a traffic stream and the perception of these conditions by motorists and/or passengers. A LOS definition provides an index to the quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very small delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively small delay; however, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher delays. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Evaluation Criteria

Evaluation criteria used in the capacity analyses are described below.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 Highway Capacity Manual. This method assesses the effect of signal type, timing, phasing, progression, vehicle mix, and geometrics on delay. Level-of-service designations are based solely on the criterion of calculated control delay, also known as signal delay. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Delay can also be a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Table T-18 summarizes the relationship between LOS and delay. The tabulated delay criterion may be applied in assigning LOS designations to individual lane groups, intersection approaches, or to entire intersections.

Table T-18
Level-of-Service Criteria For Signalized Intersections*

Level of Service	Average Control Delay (seconds per vehicle)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

*Source: Highway Capacity Manual; Transportation Research Board; Washington, DC; 2000; page 16-2.



Operations Analysis Results for Congested Locations

Table T-19 presents the results of the operations analysis results for the signalized intersection of Route 110 at Route 150.

Table T-19
Operations Analysis Results for Route 110 at Route 150

Peak Hour	Movement/Total*	V/C**	AD***	LOS+	Queue++	Length+++
Weekday Morning	Route 110 EB LT/TH	0.52	9.6	A	9.4	235
	Route 110 WB LT/TH	0.37	8.5	A	5.4	135
	Route 150 NB TH/RT	0.36	14.1	B	5.1	128
	Route 150 SB TH/RT	0.53	15.4	B	8.3	208
	Intersection	0.52	11.6	B		
Weekday Evening	Route 110 EB LT/TH	0.54	12.4	B	8.6	215
	Route 110 WB LT/TH	0.45	11.5	B	5.9	148
	Route 150 NB TH/RT	0.67	15.1	B	13.1	328
	Route 150 SB TH/RT	0.30	11.1	B	4.9	123
	Intersection	0.60	13.0	B		

* NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = Left-Turn; TH = Through movement; RT = Right Turn.

** Volume-to-Capacity ratio.

*** Average Control Delay is in seconds per vehicle.

+ Level of Service.

++ 95th percentile queue is in vehicles.

+++ Length of queue is in feet; assumes 25 feet per vehicle.

As shown in Table T-19, the intersection of Route 110 at Route 150 currently operates at LOS B during both the weekday morning and evening peak hours. According to the analysis, the longest maximum vehicle queues occur on the Route 150 northbound approach. The queues on this approach can reach approximately 328 feet in length (or 13 cars) during the weekday evening peak hour.

Build Out Condition Traffic Volumes on South Hampton Road and Market Street

Local officials requested that MVPC analyze how traffic volumes on South Hampton Road and Market Street would change should the community achieve a build out state under existing zoning. MVPC conducted a buildout analysis of the remaining developable land in the Town of Amesbury and other communities in the Merrimack Valley region under Massachusetts Executive Order Number 418, issued by Governor Cellucci on January 21, 2000. This analysis included a tally of developable land in Amesbury excluding land that is considered permanently protected open space or is protected by the Wetlands Protection Act or the Rivers Protection Act. Also, land that is constrained due to severe physical conditions, such as adverse topography, was excluded. The most intensive by-right development, in accordance with the Town's zoning requirements, was assumed to occupy all of the developable land that was not absolutely constrained. The analysis also assumed that there would be no new development on property that is currently developed. The MVPC build out analyses showed that the Town of Amesbury could hold 5,349 new residents under the current zoning and accommodate 7,046,504 square feet of commercial/industrial space.

Future year traffic volumes for South Hampton Road and Market Street, both located in the northeastern section of the town, were developed using the Merrimack Valley Planning Commission's regional traffic model. This was accomplished by calculating the number of additional jobs and dwelling units that could be added to each Traffic Analysis Zone (TAZ) in Amesbury based on the square footage of developable commercial/industrial space and number of dwellings allowed under existing zoning as identified in the community's build out analysis. Similar calculations were also performed for the other communities in the Merrimack Valley region. This latter step is necessary to account for the impact of traffic passing through Amesbury during peak travel periods.

MVPC assumed that build out conditions across the region would occur in the year 2040. This year was selected based on the rate of population growth in the region over the past 30 years, which shows an average 10-year population growth rate of about 8.7%. At that rate, the region would achieve its residential build out population limit of approximately 406,000 in just under 30 years. Build out of the region's commercial and industrial land would likely occur subsequent to the attainment of the residential build out. Consequently, a 40-year build out time horizon was selected.

As noted above, MVPC used its regional traffic simulation model to estimate how traffic volumes along South Hampton Road and Market Street would grow assuming that the build out development condition was achieved. These volumes are shown in Table T-20.

Table T-20: Buildout Analysis Results
Projected Average Daily Traffic on South Hampton Road and Market Street

Street Name	Location	2000 ADT ^a	2040 ADT ^a	Percentage Increase
South Hampton Road	South of Fern Street	3,900	7,901	102.56%
Market Street	North of Fern Street	3,340	6,809	103.86%

^aAverage daily traffic volumes in vehicles per day (vpd).

Table shows that traffic volumes on both roadways will roughly double under the build out scenario. These percentage increases in traffic volumes are well above the 32.5% increase in the population that is expected to take place in Amesbury between 2000 and the build out year of 2040. This is due to two factors. One is that there will be relatively more residential growth in this section of the town as compared to some of the more developed areas. The second reason for this large rate of traffic volume increase is that people will be entering the region on these two roadways to travel to the many new jobs that will be located in both in Amesbury and other areas in the eastern Merrimack Valley region under the build out scenario.

It should be noted that none of the volumes shown for the above roadways indicate that additional travel lanes will be needed. However, the additional volumes expected on these roadways will be such that congestion is likely to occur in Market Square resulting in a noticeable increase in traffic delay at that location.

Transportation Recommendations

The following sections outline the work of the Master Plan Steering Committee and the Transportation Focus Group to develop recommendations to guide future development patterns in the Town of Amesbury over the next 20 years. The recommendations are summarized on the Transportation Action Map.



Transportation Vision

The Transportation Focus Group developed the following Vision Statement to guide their efforts to develop recommendations.

Continue to be a Community That is Safe and Easy to Move About In

Amesbury will provide and maintain safe, healthy, efficient and environmentally friendly networks for all modes of transportation. Safe streets and efficient transportation systems will reinforce the quality of life in our neighborhoods. We will continue to be a community that is safe and easy to move about, particularly for pedestrians and bicyclists who will have access to a wide-range of community resources. We will continue to explore methods to enhance the use of public transportation, especially for connections to regional attractions, jobs and other transportation systems. To support commercial and residential viability, promote a pedestrian oriented downtown environment supported by a convenient parking supply, and streets and sidewalks that are safely connected to adjacent neighborhoods and recreational amenities.

Amesbury, Massachusetts

Amesbury Master Plan

Celebrating our past, creating our future

- Transportation Color Key**
- T-1 Provides a viable public transportation system that includes access to all modes of travel.
 - T-2 Incorporate safe and attractive "gateways" into downtown Amesbury.
 - T-3 Provide community sensitive roadway design policies that promote safe and peaceful neighborhoods.
 - T-4 Ensure a safe environment for pedestrians and bicyclists.
 - T-5 Establish measures and policies to improve roadway design, construction, and maintenance to provide a safe and efficient flow of traffic on key roadways.
 - T-6 Provide a sufficient supply of parking in mixed-use or commercial areas.

Legend



- Town Boundaries
- Town Features
 - Library
 - Post Office
 - School
 - Town Hall
 - Trails
 - Bike Trails
 - Bus Routes
- Transportation*
 - T-1/T-3
 - T-2
 - T-4
 - T-5
 - T-6
- Roads
- Hydrographic Features
 - Lakes, Rivers, Ponds, Sounds and Reservoirs
 - Streams

*See Transportation Color Key for Category Descriptions

Scale 1:9,000 or 1" = 750'


750 0 750 1500 2250 3000 Feet


** For Planning Purposes Only **



Data Sources: The data for this map was supplied by the Town of Amesbury, the Merrimack Valley Planning Commission, The Massachusetts Highway Department Central Transportation Planning Staff, and the Executive Office of Environmental Affairs/MassGIS (EG&A/MassGIS). This map was prepared by MVP for Vannase Hangen Brustlin, Inc and the Town of Amesbury as part of the Amesbury Master Plan Series. All property parcel depictions current through 1997. The information depicted on this map is for planning purposes only. It may not be adequate for legal boundary definition or regulatory interpretation.

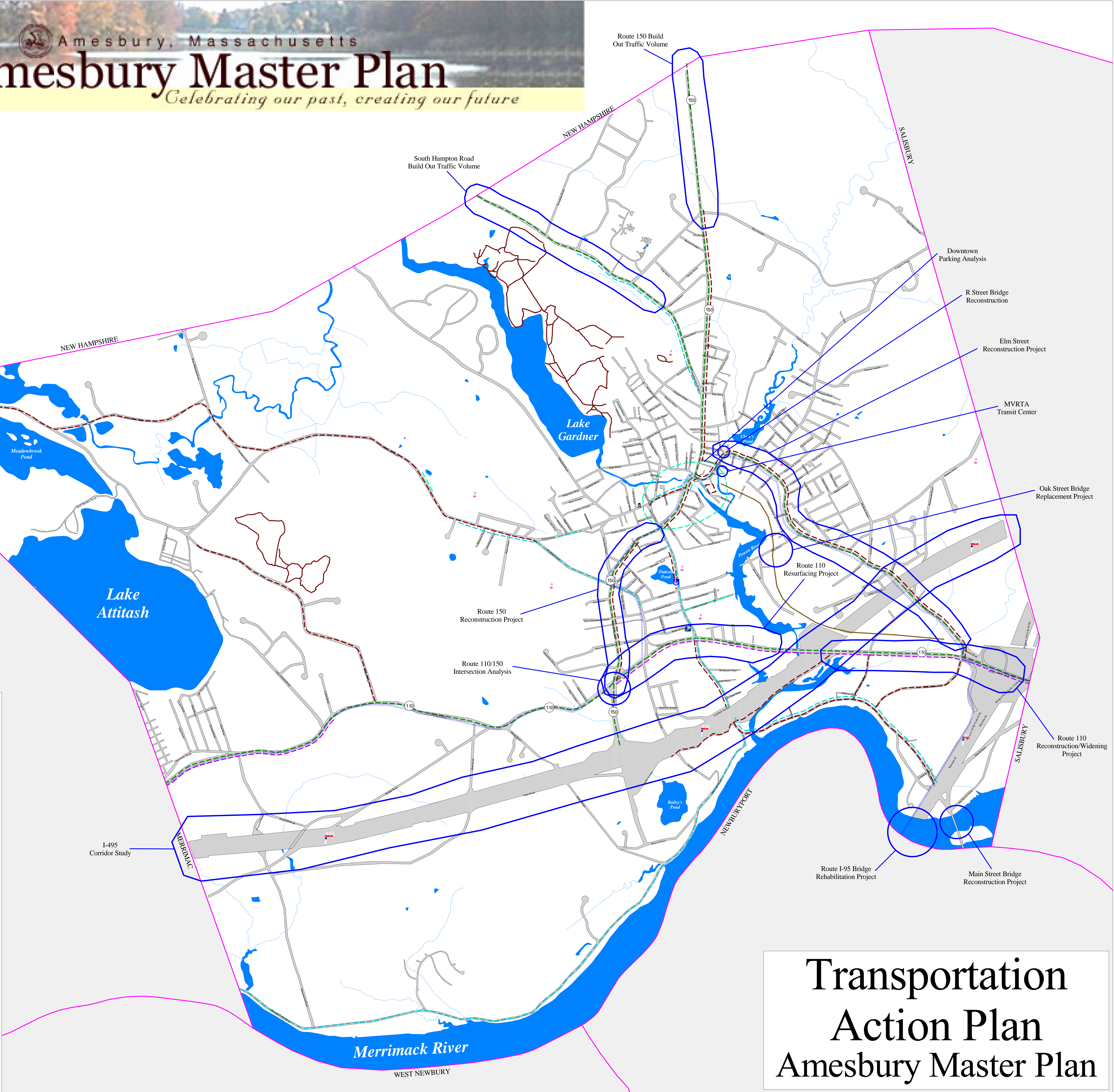
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Merrimack Valley Planning Commission (MVPC)
160 Main Street, Haverhill MA, 01830





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Transportation Action Plan Amesbury Master Plan



Goals, Strategies and Actions

T-1	Provide a viable public transportation system that includes access to all modes of travel.
T-1.1	Identify and respond to needs and demands by expanding public transportation services.
	➤ Survey the needs of the community to accommodate the current and projected transportation needs.
	➤ Explore implementation of alternative transportation services that are offered by the MVRTA, such as demand response transportation, and identify methods to expand upon services provided from the new Transportation Center in the Lower Millyard to provide improved access to regional amenities and transportation connections, especially to the MBTA services in Newburyport.
	➤ Identify methods to provide enhanced pedestrian, bicycle and automobile connections from surrounding neighborhoods to the new Transportation Center.
	➤ Implement quiet clean efficient transportation solutions i.e. electric or natural gas powered buses. This will include an investigation of measures to reduce or eliminate the ill effects of having diesel buses serve the facility.
	➤ Continue regularly scheduled communications with the Merrimack Valley Regional Transit Authority (MVRTA) to review service needs and problems, and identify methods to collaborate on providing enhanced transit services.
	➤ Involve the MVRTA in site plan review for major development projects to identify the potential for connections to transit services.
	➤ Monitor and plan for additional locations, as warranted, in Town that could serve as transit hubs in different neighborhoods in outlying areas, and work with MVRTA to provide amenities such as shelters, bike racks, park-n-ride lots and other services at these locations.
	➤ Ensure that handicapped-accessibility is incorporated.

T-2	Incorporate safe and attractive “gateways” into downtown Amesbury.
T-2.1	Maintain or improve Amesbury’s “gateway” roadways to improve aesthetic qualities, safety conditions and traffic operations. The “gateway” roadways include Rt. 110, Rt. 150, Elm Street, Friend Street, and South Hampton Road.
	➤ Implement the Route 150 and Elm Street projects currently under design and ensure that they are consistent with the Master Plan guidelines.
	➤ Develop improvement projects for other “gateway” roadways as determined to be necessary by residents and local officials.
T-2.2	Use gateway treatments (traffic calming measures) to alert motorists that they are entering neighborhoods or areas with high levels of pedestrian activity where responsible driving is necessary.
	➤ Identify areas where medians, signage, banners, landscape treatments or other urban design elements could be incorporated to alert drivers they are entering neighborhood or commercial districts.
	➤ Utilize gateway treatments to announce and promote the unique character of the downtown area or individual neighborhoods. Incorporate historic or cultural elements into signage, landscape or sculpture to reinforce this identity.

T-3	Provide community sensitive roadway design policies that promote safe and peaceful neighborhoods.
T-3.1	Investigate options to reduce the speed, noise, and volume of traffic on Amesbury’s neighborhood roads.
	➤ Identify and prioritize areas where traffic volumes and speeds are a key concern for neighborhood residents.
	➤ Increase enforcement of traffic regulations at problem areas and consider restrictions such as “resident-only access” or “time-restricted access” as in many cities, including Cambridge, Massachusetts
	➤ Review the state’s Traffic Calming Guidelines as well as the solutions and techniques of cities and communities that have implemented Traffic Calming Measures and adopt appropriate measures to control traffic speeds along residential collector and minor arterial roadways.
	➤ Consider time restrictions for large trucking activities in residential areas.
	➤ Establish and enforce noise ordinances for cars, trucks, motorcycles, audio systems.
	➤ Implement appropriate mitigation measures to address highway noise (I-495 and I-95) in neighborhoods.

T-4	Ensure a safe environment for pedestrians and bicyclists.
T-4.1	Provide safe and convenient connections between neighborhoods, schools, parks and open space areas, commercial areas and other resources located near the downtown area. <i>See also Public Facilities and Infrastructure Goal 2.1.</i>
	➤ Develop a policy to guide the prioritization of funding pedestrian and bicycle transportation improvements.
	➤ Prepare an inventory of where sidewalk improvements are needed and establish a system to update this information regularly.
	➤ Identify areas where new sidewalks and pedestrian/bicycle routes are needed.
	➤ Provide enhanced crosswalks at key locations either through enhanced striping and signage, raised or textured surface materials.
	➤ Seek State and alternate funding sources to assist with new or rehabilitated pedestrian and bikeway improvements.

T-4.2	Enhance resources for bicyclists for both recreational and commuting purposes.
	➤ Identify and improve potential linkages to the Riverwalk from adjacent neighborhoods.
	➤ Coordinate with regional communities to create a plan for a bicycle route along the Merrimack River to Newburyport and Merrimac.
	➤ Expand the Riverwalk to connect with Rail Trail in Salisbury and to provide bicycle and pedestrian linkages to surrounding neighborhoods, including access to Clark's pond and the Cedar Street areas via the river banks extending from the Lower Mill Yard.
	➤ Explore the potential for off-road bike paths where feasible.
	➤ Provide a well integrated bicycle path system connecting all neighborhoods with the downtown area-
	➤ Prepare a map of bicycle routes and walking trails/paths in town and distribute through schools and other recreational venues.
	➤ Provide amenities such as bike racks, benches, lighting and trash receptacles along key pedestrian and bikeways to ensure comfort and convenience of these areas.

T-5	Establish measures and policies to improve roadway design, construction, and maintenance to provide a safe and efficient flow of traffic on key roadways.
T-5.1	Reduce traffic congestion and traffic safety problems at locations within the community while preserving the character of roadways and neighborhoods.
	➤ Monitor the design and permitting of roadway improvement projects on the Route 110 Corridor from Route 150 to the Salisbury Town line.
	➤ Participate in the MHD study of the I-495 corridor to discuss improvement options to Exits 54 and 55 in Amesbury and potential to create direct/better connections between I-495 and I-95.
	➤ Monitor traffic congestion and safety conditions on roadways in the community and develop improvement projects based on a prioritized listing of problem locations.
	➤ Review school bus-stopping policy to promote traffic flow without compromising student safety.
T-5.2	➤ Promote enhanced access management tools and techniques to mitigate congestion and improve safety.
	➤ Monitor and identify transportation corridors where congestion is significant, and prepare access management plans to enhance the flow of traffic.
	➤ Where necessary, revise zoning/subdivision regulations governing driveway spacing, sight distances, number of driveways per existing parcel or lot, and corner lot clearances to minimize conflicts with vehicles entering roadways.
	➤ Where necessary, revise zoning/subdivision regulations to require connection of parking areas on adjacent commercial lots on busy roadways such as Route 110 so traffic can move between them without traveling on the highway.
	➤ Where necessary, revise zoning/subdivision regulations to require, where appropriate, shared use of driveways to limit the number of access points on busy roadways. Following either of these strategies will require the promotion of unified on-site circulation and parking plans.
	➤ Where necessary, revise zoning/subdivision regulations to align driveways where developments are situated on either side of a roadway, to reduce conflicts from turning traffic.

T-5.3	Utilize innovative roadway design and construction methods to maximize efficiency.
	➤ Consider MHD's Highway design standards when adopting town policies and procedures for construction and improvement projects. These changes, when implemented, should result in projects that improve traffic flow while better preserving the Town's character.
	➤ Develop a Pavement Management Program to examine road conditions, identify appropriate treatment measures, and maximize the productivity of the Town's road maintenance budget.
T-5.4	➤ Guarantee coordination of major transportation and public works projects.
	➤ Establish regular meetings between Town Department of Public Works officials and utility companies to review schedule of roads/ bridge projects. Such policy should help to prevent unnecessary opening of recently repaired/ reconstructed roadways.
	➤ Consider establishing a Roadway Advisory Committee to assist in the development of the road improvement program.

T-6	Provide a sufficient supply of parking in mixed-use or commercial areas.
T-6.1	Ensure that there is adequate downtown parking areas that are safe, convenient and easy to find.
	➤ Work with the Merrimack Valley Planning Commission to implement and monitor the recommendations made in the 2002 parking study of the downtown area, and update the recommendations as build-out of the area advances.
	➤ Continue efforts to work with private property owners to identify where private lots could be converted to public parking facilities and develop flexible zoning regulations to promote shared parking where appropriate and feasible including the potential for incentives for downtown employed persons to use neighboring churches for parking during weekday hours.
	➤ Develop and implement appropriate parking management strategies to ensure a balance of parking for visitors, employees and residents within the downtown core.
	➤ Continue to plan for construction of additional parking facilities on identified lots, including provisions for a public parking garage if warranted.
	➤ Enhance pedestrian linkages between parking lots and downtown buildings to give more options to downtown parkers.
	➤ Conduct a way finding study to develop a coherent signage program to direct visitors to parking facilities in the downtown business district.
T-6.2	➤ Provide sufficient parking in outlying areas.
	➤ Investigate opportunities, including flexible zoning regulations, to promote shared parking between adjoining land uses with different hours of operations.
	➤ Develop a management plan that will address parking procedures/ policies for events that do not have adequate parking available.

